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The variation of biodiversity across space has been fascinating ecologists and biogeographers for centuries. However, there is ongoing debate on the mechanisms underlying the observed diversity patterns. Furthermore, there is a clear bias in macroecology and biogeography towards investigations on the marine and, particularly, on the terrestrial realm, although the investigation of freshwater ecosystems may provide valuable insights into the processes determining spatial diversity patterns. Here, we analyze the variation in alpha- and beta-diversity across latitude for all European freshwater animals (> 14,000 species) as well as the species richness patterns of European and North American Odonata. In the latter study, we showed that species of standing waters have larger and more northern ranges than species of running water habitats [1]. We explain this by the fundamental differences between the two habitat types in terms of temporal and spatial stability which strongly influence the dispersal ability of the species. These results corroborate the findings of other studies [2,3]. Accordingly, investigating the alpha-diversity of 25 pre-defined biogeographic freshwater regions we found that the relationship between species richness and latitude is not concordant across different habitat types: Groundwater and running water habitats show a monotonous decrease of species richness with increasing latitude, whereas standing water habitats exhibit a hump-shaped relationship. Furthermore, species adapted to standing water bodies show lower levels of beta-diversity among biogeographic regions. Overall, we emphasize the importance of considering ecological traits of species to explain current patterns of biodiversity.

References

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